

The notes on the different plants supply the opportunities for considering accessory problems; thus the scarlet runner introduces twining, the marsh marigold leads up to a discourse on marsh plants, and so on. The volume concludes with a short epitome of ecological principles, while at the end of each chapter searching questions are proposed for solution. The author is to be congratulated on the excellent features of his book, which may be summarised as a clear diction, a logical sequence, and a recognition of the essentials.

The volume prepared by Mr. Percival Westell and Mr. Cooper does not present any very unique features. It is a systematic book containing a few coloured and numerous illustrations that are quite good, especially those in colour. A preliminary chapter furnishes hints on collecting, after which an explanation of general systematic and morphological terms leads to the enumeration of species. The salient distinctions of each order are given, and the specific characters are scheduled at the expense of much space. The book is somewhat simpler than a flora, but less complete, as only about 200 species are described.

ELEMENTARY PHYSICS.

(1) *First Year Physics*. By Charles E. Jackson. Pp. vii+112. (London: Methuen and Co., n.d.) Price 1s. 6d.

(2) *Einführung in die Elektrochemie*. By Prof. W. Bernbach. Pp. iv+140. (Leipzig: Quelle and Meyer, 1907.)

(3) *Magnetism and Electricity and the Principles of Electrical Measurement*. By S. S. Richardson. Pp. viii+596. (London: Blackie and Son, Ltd., 1908.) Price 5s. net.

(1) **T**HIS small manual is intended as a first-year text-book for schools where three or four hours per week are devoted to the subject. The book is divided into two portions; the first, theoretical, and consisting of about 100 pages, deals with units of measurement, length, area, volume, density, pressure, and force. The second part consists of 76 laboratory exercises bearing on the subject-matter of the first portion. In addition, examples for home work are given at the ends of each chapter. The book is written in clear and simple language, and the illustrations are good. The section on "Mixtures," p. 51, is ill-chosen. A theoretical calculation of the density of a mixture as there indicated will most probably differ from that obtained practically by the pupil, owing to change in volume on mixing. Again, good practical results cannot be obtained from the pendulum experiments if carried out according to the directions indicated on p. 85, viz. :—

"Allow the pendulum to swing through an arc of about 3 in. long and measure the time of 10 complete swings, using a watch with a seconds' hand for this purpose. . . . Repeat taking 20, 30, &c., swings, and from each measurement calculate the time of one swing. The result in each case should be the same."

Again, in section 136 we are told to time 20 swings when investigating the variation of period with length,

and as an example 1.42 sec. is given as a period calculated from such an observation.

(2) The title of this book is somewhat misleading, as it does not deal with the applications of electrical methods to chemical industries, but is intended as an introduction to the study of physical chemistry. Although the treatment is of an elementary nature, the book may be profitably read by students of physics and chemistry. The first chapter is devoted by the author to a *résumé* of the laws and principles of electricity; the second chapter contains the fundamental conceptions and definitions on which the science of physical chemistry is based. The remainder of the book deals with such subjects as the electrolytic dissociation theory of Arrhenius, osmotic pressure, conductivity of electrolytes, migration of ions, and the theory of the voltaic cell. References to more advanced works on the subject are given at the end of the book.

(3) This text-book assumes a knowledge of the elementary descriptive portions of magnetism and electricity, and is intended for those students who are pursuing the subject further, either as a branch of pure physics or in preparation for a course of applied electricity. The author does not assume more than an elementary knowledge of the principles of trigonometry and mechanics in dealing with the subject. The treatment, on the whole, is very clear and concise, and the book contains considerably more matter than is usually found in books of this standard. Solutions of many questions set in recent examinations are included in the text, or given as examples to illustrate the subject-matter. These will, no doubt, commend the book to many students preparing for examinations. The statement on p. 27, "When the lines of force are parallel the field is of uniform strength," is not a very intelligible way of defining a uniform magnetic field for an elementary student. Again, on p. 97, "If a conductor carrying an electric current is placed in a magnetic field it is subject to a mechanical force which depends on the length of the conductor, the current strength, and on a measure of the field," is a somewhat loose statement, there being no mention of the direction of the field with respect to the conductor. In Fig. 204, on p. 446, "Measurement of Thermoelectric Force," the connections are apparently wrong, although the author gives no explanation of the various parts of this figure.

OUR BOOK SHELF.

Text-book of Physiological Chemistry, in Thirty Lectures. By Emil Abderhalden. Translated by William T. Hall and George Defren. Pp. xiii+722. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1908.) Price 21s. net.

WHEN Prof. Abderhalden's book was published in German about two years ago, its general excellence was at once noted, and it stepped immediately into the front rank of text-books which deal with this important and rapidly growing branch of physiology. Its author had already made for himself a great reputation as an original investigator, and as Prof. Emil Fischer's chief lieutenant had done much to elucidate the fundamental question which lies at the root of biochemistry, namely, the constitution of the protein molecule. In spite of

being a prolific worker, he has found time to write a text-book, and in so doing has established for himself another reputation as a clear and thoughtful exponent of the things the student should know. Copious references to the bibliography of the subject enhance the value of the work.

Books on physiological chemistry, or biochemistry, as it is the fashion just now to term it, have been very numerous of late. This merely indicates how assiduous are the disciples of this department of science at the present day. It was inevitable, however, that Prof. Abderhalden's book should receive the honour of translation into other tongues, and all will welcome its appearance in English dress. The translators have carried out their task with great skill, and have successfully preserved the lucid style of the original. The difficulty of international nomenclature in science is always with us, but is perhaps nowhere so conspicuous as in chemistry. Even in the English language there are no fixed rules, and such rules as do exist are often more honoured in the breach than in the observance. The Chemical Society of London has formulated laws on this question, and we believe that the American Chemical Society has acquiesced in them. There is therefore some hope for uniformity in the future, and it is gratifying to find in the present translation that these rules are observed.

In reference to protein nomenclature, a joint committee of the Chemical and Physiological Societies recently issued a report, and as the main recommendations have been also adopted by the corresponding American societies there is again some hope that authors may see their way to adopt them also, and so do something to bring order out of chaos. The translation of Prof. Abderhalden's book, however, had gone to press before this report was issued, so that in certain points (for instance, the retention of the term nuclealbumin) the old confusion is perpetuated.

But, as the translators wisely say in their preface, it seems probable that in view of the rapid progress which is being made in this branch of chemistry, before long we shall be able to adopt a chemical classification of the proteins which will be better than any yet proposed.

W. D. H.

Double Star Astronomy. Containing the History of Double-star Work; Computation of Orbits and Position of Orbit Planes; Formulæ in Connection with Mass, Parallax, Magnitude, &c. By T. Lewis. Pp. 46. (London: Taylor and Francis, 1908.) Price 2s.

WE doubt if Mr. Lewis has done himself justice in this little work, by which is meant that anyone might read the pamphlet and fail to recognise that he was in presence of a master. Within the small limits to which he has confined himself, it was impossible for the author to discuss the subject with the fulness it demands or the completeness that his experience would approve. He is our authority on double-star work. His familiarity with the subject has been abundantly demonstrated, his researches have been thorough and minute, and his success has been pronounced. We do not forget that here he is writing for amateur astronomers, who particularly affect double-star observation, and to many of whom the past history of astronomy is a blank. These will welcome the historical notes showing what has been accomplished, and by what means our knowledge has been enriched.

From history the author passes to computation, and we can sincerely hope that, guided by the excellent practical methods clearly set out, and illuminated by examples, many observers will be tempted to advance a step beyond mere observation. Of course, the information necessary for computing a new or correcting an approximate orbit increases but slowly, and

opportunities may not very readily offer. It is perhaps more desirable that an observer should be able to compare his measures of position angle and distance with the places deduced from known elements. These means are provided and illustrated here, and by using them the observer will learn whether it is worth while to continue his measures of a particular star or to remove it from his working list, because he will see not only whether there is a wide discrepancy between the measures and the computed places, pointing to the necessity of correcting the elements, but whether the position of the companion is moving so rapidly as to demand frequent measures. In a word, the student of this little book will be able to observe more intelligently, more usefully, and with greater delight to himself.

The Threshold of Music. By Dr. William Wallace. Pp. xii+267. (London: Macmillan and Co., Ltd., 1908.) Price 5s. net.

DR. WALLACE has endeavoured in these pages to trace the development of the musical sense in the human race from the earliest ages up to the present time, and to trace its relation to the development of thought in other directions. In the chronological chart which is appended he "represents graphically in a diagram" the lifetimes of the principal composers on the scale of one millimetre to the year, side by side with those of men eminent in science, literature, and art. No one will doubt the author's main contention that the development of modern music has taken place according to the natural laws of evolution, and a book written with this object, though admittedly touching only the fringe of the subject, opens up a highly interesting field of study.

Dr. Wallace clearly shows how the old classical ideal found its culminating point in the works of Beethoven, and that the demand for "more expression," or, as we should say, a closer connection between music and other phases of thought, led to the development of the modern school. In our opinion the two schools stand in somewhat the same relation to one another as pure and applied mathematics. Dr. Wallace considers that still higher musical ideals may be attained in the future. But we would suggest that the transition from pure to applied music has been rather the outcome of causes which have involved degeneration from the perfection of form of the older school, just in the same way that the requirements of the practical man involve the use of approximate methods which represent a sacrifice of the perfection of form of the theories of the pure mathematician. It is little to be wondered at that in an age when men's sense of sound is deadened by the perpetual din of electric trams, motor-cars, and typewriters they should be able to endure and appreciate complex minor chords and discords blasted out "fff" or even "ffff" by an orchestra the overtones of the instruments of which afford no approximation to harmonic series, and the chaotic effect of which is further intensified by the acoustic properties of the concert hall.

Vorlesungen über technische Mechanik. By Dr. August Föppl. Vol. v. Pp. xii+391. (Leipzig: B. G. Teubner, 1907.) Price 10 marks.

THE point which strikes an English reader most forcibly on opening this book is that "technical mechanics" in Germany means something much more thorough and scientific than it does in England. Here we have a highly mathematical treatise on the theory of elasticity dealing with the flexure and vibrations of plates, the bending and torsion of beams, including Saint Venant's problem and its solutions for the ellipse, equilateral triangle and rectangle, the latter involving the usual application of Fourier's series,